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July 28, 1997

CALFED Bay-Delta Program  
1416 Ninth Street, Suite 1155  
Sacramento, CA. 95814

Dear CALFED:

People for Healthy Forests (PFHF) wishes to have the enclosed inquiry proposal reviewed by CALFED, so that we might receive helpful comments on our proposal. We plan on submitting a full-length proposal for CALFED's funding consideration in the Fall of 1997.

Please address all correspondence related to this proposal to Dr. Robert Stack, at the address below. Thank you very much.

Sincerely,

Robert Stack  
PO Box 1709  
Murphys, CA 95247  
(209) 728-2353  
(510) 769-6308 (Voice Mail)  
(510) 814-9009 (FAX)

**Title:** Reintroduction of the California Red-Legged Frog to the Central Sierra Nevada  
Phase 1: An Assessment of Herbicide Effects on Algal Populations in Low  
Elevation Streams of the Sierra Nevada

**Applicant:** People for Healthy Forests  
PO Box 3272  
Sonora, CA 95370  
(209) 532-2956 (Phone & FAX)

**Principal Investigator:** Robert Stack, Ph.D.  
**and Contact Person** PO Box 1709  
Murphys, CA 95247  
(209) 728-2353  
(510) 769-6308  
(510) 814-9009 (FAX)

**Project Description and Primary Biological/Ecological Objectives:** The primary objective of this inquiry proposal is to make a biological assessment of the changes in water quality induced in mid-elevation sierran streams by forestry herbicide use practices. The Stanislaus National Forest (SNF) alone - located in Calaveras, Tuolumne, and Mariposa counties - plans to use herbicides on over 200,000 acres over the next few years. Further substantial increases in herbicide use is currently in planning stages in this and other sierran National Forests. Limited chemical monitoring conducted to date by the SNF routinely detects low but measureable amounts of herbicide in the streams draining the watersheds of treated areas. The SNF does not conduct any significant biological monitoring in the affected streams, most of which have a designated beneficial use of wildlife and fresh water habitat. People for Healthy Forests (PFHF) proposes to perform a volunteer-based citizens monitoring program to assess the effects of herbicide usage on aquatic macroinvertebrates.

**Approach/Tasks/Schedule:** PFHF has already initiated work on this project, having persuaded officials from both the SNF and the Central Valley Regional Water Quality Control Board (CVRWQCB) to collaboratively work together on this project. A detailed Memorandum of Understanding (MOU) between the three parties is currently in preparation. This MOU outlines the major responsibilities of each organization as follows: SNF - conduct a program to monitor herbicide levels in streams; CVRWQCB - test samples from these streams for toxicity (three species tox test); and PFHF - conduct a program to monitor the changes in the aquatic macroinvertebrates over a multiyear period. All of the information will be shared amongst the parties in an attempt to determine if current herbicide use practices are sufficient to protect beneficial uses, or whether changes in such need to be made. The parties are planning a three year project, which would examine herbicide effects in two watersheds (with two additional reference watersheds). The project was initiated in Fall 1996.

**Justification for Project and Funding by CALFED:** It is clear that the health of the bay-delta ecosystem has a direct connection to conditions in upland watersheds. Herbicide residues from forestry use flow down from these drainages and contribute to the total load of such compounds coming into the bay-delta region. In addition, use of such compounds leads to increased erosion from these drainages, with a concomitant increase in the sediment load carried downstream. This project will make the first

systematic attempt to address herbicide effects on aquatic biota in a cost-effective, collaborative manner. In addition, by conducting long-term monitoring of aquatic invertebrates in low to mid-elevation streams of the central Sierra Nevada this project will also create a thorough inventory of macroinvertebrates from watersheds of this area. Such data will play a significant part in future planning and management activities, as promoted by the California Department of Fish and Game (DFG). The data should also shed light on whether herbicide-treated watersheds may be considered appropriate habitat for re-introduction of the California Red-Legged Frog (*Rana aurora*, RLF), which is a long-term goal of PFHF. A review of the scientific literature suggests that herbicide use in particular might be present at levels sufficient to impact fresh water algae, which tadpoles depend on as a primary food source. We plan to assess potential effects on algae indirectly by looking at the populations of aquatic "grazers" for a variety of scientific and practical reasons.

**Budget Costs and Third Party Impacts:** The three participants in this project have decided to share the costs of this project according to the responsibilities which each has agreed to take on. Thus PFHF, with its responsibility to conduct a multiyear, volunteer-based aquatic invertebrate monitoring program, has the responsibility to raise the funds to ensure its obligations are met. We estimate that approximately \$150,000 will be required over this three year period, or \$50,000 per year. Of this amount, approximately half would be used to provide salaries for a project director (\$12,000/year), a community outreach director (\$12,000/year), and two student interns (\$1,000/year for each). These interns would be selected from our local community college (Columbia College, Columbia, CA), in conjunction with college faculty. The rest of the funds would provide lab equipment and supplies, and pay for administrative and office expenditures. To date, PFHF has raised \$22,000 from private foundations to initiate this project - \$10,000 from the Goldman Family Foundation, \$8,000 from the Heller Foundation, and \$4,000 from the Nu Lambda Trust. Thus CALFED funding will be considerably "leveraged" with other funds from both the public and private sectors. We do not believe there are any significant third party impacts to either our short term (assessment) or long-term (re-introduction) goals.

**Applicant Qualifications:** PFHF is a membership-based, non-profit environmental organization located in the central Sierra Nevada (Sonora, CA). It is a registered 501c-3 organization under IRS guidelines. The principal investigator and project director is Robert Stack, who holds a Ph.D. in biochemistry from U.C. Davis (1983). Dr. Stack consults with several Bay Area biotechnology companies, and is well-versed in toxicology and the various issues involved. Dr. Stack also has considerable project management experience - most recently as the Director of Cancer Research for a Bay area biotechnology company.

**Monitoring and Data Evaluation:** We plan to survey aquatic invertebrates from two watersheds, each having a paired reference stream that has not been sprayed with herbicides. Each stream pair will be sampled at least once in the fall preceding herbicide treatment in order to acquire baseline data, as most spraying occurs in the spring. We plan to sample sites again in the spring just prior to treatment and one

week post the first significant rainfall following treatment. This is due to the fact that the herbicide of most concern, hexazinone, is typically applied as a rainfall-activated pelleted formulation. Summer sampling is also planned. All sampling and laboratory work will be performed according to established protocols, and results will be professionally validated as per DFG guidelines. Data will be evaluated by each and all parties, with both in-house and external personnel. A final and several interim (six-month) project reports will be issued.

**Local Support/Coordination/Compatibility with CALFED Objectives:** There is broad support in the local community for a project that seeks to address the concerns that many in the area have with respect to forestry herbicide use practices. PFHF believes that its goal of re-introducing the RLF enjoys especially strong public support, as this frog is widely reputed to be Mark Twain's "Celebrated Jumping Frog of Calaveras County." The well-known annual Jumping Frog Jubilee in Angel's Camp, CA has been devoid of its original amphibian jumpers for some time now, as the species is believed to be extirpated from the central Sierra Nevada. Coordination of PFHF activities is already underway with SNF and CVRWQCB on the watershed assessment, with Columbia College providing additional support in the form of access to laboratories and enthusiastic students as volunteers and, hopefully, interns. PFHF plans to initiate contact and work with both the SNF and US Fish and Wildlife Service personnel on our frog re-introduction plan. PFHF believes that the health of the Bay-Delta ecosystem is inherently dependent on the quality of its inflows, and our proposal seeks to address in a highly cooperative and cost-effective manner the effects of a potentially significant stressor on tributary streams. It will also provide significant biological baseline data to guide current and future management objectives, and serve as important criteria in selecting streams for RLF re-introduction.